

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

5 a substrate provided with a region of the back surface having concentrated dislocations at least on part of the back surface thereof;

a semiconductor element layer formed on the front surface of said substrate;

10 an insulator film formed on said region of the back surface having said concentrated dislocations; and

a back electrode formed to be in contact with a region of the back surface of said substrate other than said region of the back surface having said concentrated dislocations.

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2. The semiconductor device according to claim 1, wherein

20 said semiconductor element layer is provided with a region of the front surface having said concentrated dislocations at least on part of the front surface thereof,

25 said semiconductor device further comprising a front electrode formed to be in contact with a region of the front surface of said semiconductor element layer other than said region of the front surface having said concentrated dislocations.

3. The semiconductor device according to claim 1,  
wherein

said substrate includes a nitride-based semiconductor  
5 substrate.

4. A semiconductor device comprising:

a semiconductor element layer formed on the front  
surface of a substrate and provided with a region of the  
10 front surface having concentrated dislocations at least on  
part of the front surface thereof;

an insulator film formed on said region of the front  
surface having said concentrated dislocations; and

a front electrode formed to be in contact with a  
15 region of the front surface of said semiconductor element  
layer other than said region of the front surface having  
said concentrated dislocations.

5. The semiconductor device according to claim 4,  
20 wherein

said substrate is provided with a region of the back  
surface having said concentrated dislocations on at least  
part of the back surface thereof,

said semiconductor device further comprising a back  
25 electrode formed to be in contact with a region of the

back surface of said substrate other than said region of the back surface having said concentrated dislocations.

6. The semiconductor device according to claim 5,  
5 wherein

said substrate includes a nitride-based semiconductor substrate.

7. The semiconductor device according to claim 5,  
10 wherein

the side of said back electrode is provided on a position inwardly separated from the side of said substrate by a prescribed interval.

8. The semiconductor device according to claim 5,  
15 further comprising an insulator film formed on said region of the back surface having said concentrated dislocations.

9. A semiconductor device comprising:  
20 a semiconductor element layer formed on the front surface of a substrate and provided with a region of the front surface having concentrated dislocations at least on part of the front surface thereof;

a recess portion formed on a region of the front  
25 surface of said semiconductor element layer located inward

beyond said region of the front surface having said concentrated dislocations; and

5 a front electrode formed to be in contact with a region of the front surface of said semiconductor element layer other than said region of the front surface having said concentrated dislocations.

10. The semiconductor device according to claim 9, wherein

10 said substrate is provided with a region of the back surface having said concentrated dislocations at least on part of the back surface thereof,

15 said semiconductor device further comprising a back electrode formed to be in contact with a region of the back surface of said substrate other than said region of the back surface having said concentrated dislocations.

11. The semiconductor device according to claim 10, further comprising an insulator film formed on said region of the back surface having said concentrated dislocations.

12. The semiconductor device according to claim 10, wherein

25 said substrate includes a nitride-based semiconductor substrate.

13. A semiconductor device comprising:

a semiconductor element layer formed on the front surface of a substrate and provided with a region of the front surface having concentrated dislocations at least on part of the front surface thereof;

a high resistance region formed in said region of the front surface having said concentrated dislocations; and

a front electrode formed to be in contact with a region of the front surface of said semiconductor element layer other than said region of the front surface having said concentrated dislocations.

14. The semiconductor device according to claim 13, wherein

said high resistance region includes an impurity introduction layer formed by introducing said impurity.

15. The semiconductor device according to claim 13, wherein

said substrate is provided with a region of the back surface having said concentrated dislocations at least on part of the back surface thereof,

said semiconductor device further comprising a back electrode formed to be in contact with a region of the

back surface of said substrate other than said region of the back surface having said concentrated dislocations.

16. The semiconductor device according to claim 15,  
5 further comprising an insulator film formed on said region of the back surface having said concentrated dislocations.

17. The semiconductor device according to claim 15,  
wherein

10 said substrate includes a nitride-based semiconductor substrate.

18. A semiconductor device comprising:

a semiconductor element layer formed on the front  
15 surface of a substrate and provided with a region of the front surface having concentrated dislocations at least on part of the front surface thereof while including an active layer; and

a front electrode formed to be in contact with a  
20 region of the front surface of said semiconductor element layer other than said region of the front surface having said concentrated dislocations, wherein

the upper surface of said region of the front surface having said concentrated dislocations is partially removed  
25 by a prescribed thickness and located downward beyond said

active layer.

19. The semiconductor device according to claim 18,  
wherein

5       said active layer is formed in a region of the front  
surface of said semiconductor element layer other than  
said region of the front surface having said concentrated  
dislocations.

10       20. The semiconductor device according to claim 19,  
wherein

      said semiconductor element layer includes a first  
conductivity type first semiconductor layer formed under  
said active layer,

15       said first semiconductor layer includes a first  
region having a first thickness located inward beyond said  
region of the front surface having said concentrated  
dislocations and a second region, including said region of  
the front surface having said concentrated dislocations,  
20       having a second thickness smaller than said first  
thickness, and

      said active layer has a width smaller than the width  
of said first region of said first semiconductor layer.

25       21. A semiconductor device comprising:

a substrate including a first region having a first thickness and a second region provided with a region of the front surface having concentrated dislocations at least on part of the front surface thereof while having a  
5 second thickness smaller than said first thickness;

a semiconductor element layer formed on said first region of the front surface of said substrate other than said second region provided with said region of the front surface having said concentrated dislocations; and

10 a front electrode formed to be in contact with the front surface of said semiconductor element layer.

22. The semiconductor device according to claim 21, wherein

15 said semiconductor element layer includes:

a first conductivity type first semiconductor layer, an active layer formed on said first semiconductor layer, and

a second conductivity type second semiconductor layer  
20 formed on said active layer.

23. The semiconductor device according to claim 22, wherein

said active layer has a width smaller than the width  
25 of said first semiconductor layer.



24. A semiconductor device comprising:

a substrate provided with a region of the front  
surface having concentrated dislocations at least on part  
5 of the front surface thereof;

a first selective growth mask formed on a region of  
the front surface of said substrate located inward beyond  
said region of the front surface having said concentrated  
dislocations with a width smaller than the width of said  
10 region of the front surface having said concentrated  
dislocations;

a semiconductor element layer formed on a region of  
the front surface of said substrate other than a region  
formed with said first selective growth mask; and

15 a front electrode formed to be in contact with a  
portion of the front surface of said semiconductor element  
layer located inside said first selective growth mask.

25 25. The semiconductor device according to claim 24,  
further comprising a second selective growth mask formed  
on a region located outward beyond said first selective  
growth mask at a prescribed interval from said first  
selective growth mask.

26. The semiconductor device according to claim 25,

wherein

said second selective growth mask is formed on said region of the front surface having said concentrated dislocations.

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27. A method of fabricating a semiconductor device, comprising steps of:

forming a semiconductor element layer on the front surface of a substrate provided with a region of the back surface having concentrated dislocations at least on part of the back surface thereof;

forming a back electrode to be in contact with the back surface of said substrate; and

removing said region of the back surface having said concentrated dislocations after forming said semiconductor element layer and said back electrode.

28. The method of fabricating a semiconductor device according to claim 27, wherein

said step of removing said region of the back surface having said concentrated dislocations includes a step of removing a portion between the back surface of said substrate and the front surface of said semiconductor element layer with a substantially identical width.

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29. The method of fabricating a semiconductor device according to claim 27, wherein

said substrate includes a nitride-based semiconductor substrate.